

ABSTRACT

The invention consists of a system and method for regenerating and converting optical signals. The invention provides both “2R (i.e. reamplification and reshaping) and “3R” (i.e. reamplification, reshaping, and resynchronization (or retiming)) regeneration. The components of the inventive system include a tunable continuous wave (CW) laser source, an optical circulator, an semiconductor optical amplifier (SOA), and a spectral filter that has a very sharp cutoff frequency. In alternative embodiments, the filter may be replaced with an interleaver that passes several wavelengths. A single interleaver may be used by several of the optical regenerators/converters described herein. Each regenerator uses a separate wavelength that is associated with a passband frequency of the single interleaver. During counter-propagation in the SOA, a CW signal from the CW laser is chirped by bits in an input signal. The chirped signal is then output to the filter, which blocks the original CW signal.